1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Purpose of Proposed Project

The purpose of the proposed project is to provide for an improved transportation system in Jo Daviess and Stephenson Counties through a transportation facility that properly addresses existing and projected system deficiencies and seeks to improve the safety and efficiency of the transportation system (Figure 1-1). This would include the high level of trip demands in Jo Daviess and Stephenson Counties caused by increasing community and economic development within the area. The proposed project should integrate the needs of increased development, system capacity, travel safety, community access, and system continuity.

The proposed project would provide a high-type highway with an appropriate connection to the four-lane facility west of Illinois Route 84, northwest of the city of Galena, and extend 47 miles to the east connecting to a previously approved four-lane facility east of Bolton Road, northwest of the city of Freeport (see Figure 1-2). This improvement and the Mississippi River crossing (Julien Dubuque Bridge) are the only remaining two-lane sections of U.S. Route 20 left to be studied for multi-lane improvements between Waterloo, Iowa and Rockford, Illinois. The Dubuque Metropolitan Area Transportation Study (DMATS) in cooperation with the Iowa Department of Transportation and the Illinois Department of Transportation (Department) is currently studying increasing the system capacity over the Mississippi River between Dubuque and East Dubuque.

The termini have been established so that U.S. Route 20 would function independently without forcing further improvements that may have impacts not addressed in the environmental studies, and so that the project would not restrict other future transportation improvements.

1.2 History

There has been a formal interest in modernizing U.S. Route 20 in northwestern Illinois since the interstate system took form. In 1963, the Illinois State Legislature responded to the interest in improving such routes as U.S. Route 20 by establishing the Transportation Study Commission (TSC). The TSC was charged with preparing a comprehensive study for modernizing the State's transportation system. The study was completed in 1967 and recommended a long-range program of development based on a complete network of arterial, collector and access routes throughout the State. To meet the future need for arterial routes, the study proposed the integration of planned federal interstate routes with a new State Supplemental Freeway System.

The 1967 TSC study identified a freeway location in the northwestern part of the state between Dubuque, Iowa and Rockford, Illinois. It was designated as Federal Aid Primary (FAP) Route 401 and closely paralleled U.S. Route 20 (U.S. Route 20 has subsequently been redesignated as FAP 301). A freeway in this location was based on the need to provide accessibility to interstate type service and improve east-west traffic service to this part of the state.

Corridor studies were prepared from 1967 through 1969 for a major portion of the Supplemental Freeway System. These studies identified the need for, and location of, a new freeway along the section of FAP 401 in Jo Daviess and Stephenson Counties. However, the proposed freeway was not carried through design and construction because of a reorganization of funding priorities and changes in federal environmental regulations.

Figure 1-1 Project Area Map

Figure 1-2 Regional Map

The latest stage in developing a comprehensive system of highways at the national level came with the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). This federal legislation established a National Highway System to provide an interconnected system of principal arterial routes to serve interstate and interregional travel, meet national defense requirements, and serve major population centers, international border crossings, ports, airports, public transportation facilities, other intermodal transportation facilities, and major travel destinations. Among the highways included in the National Highway System are the interstates. Other urban and rural principal arterials that fulfill the purposes of the system are also included in the system. U.S. Route 20 between Rockford and East Dubuque was included in the National Highway System on November 28, 1995.

U.S. Route 20 was included in the National Highway System because it continues to be a principal rural arterial serving the major population centers of Galena, the Galena Territory and the city of Freeport within Jo Daviess and Stephenson Counties. U.S. Route 20 also links such important north-south roadways and population centers as I-39 at Rockford; I-90 at Rockford, which has a north-south orientation between Rockford and Madison, Wisconsin; and Illinois Route 26 at Freeport. It crosses the Mississippi River between Dubuque, Iowa and East Dubuque, Illinois and links U.S. Routes 52, 61 and 151 at Dubuque. It also links I-380 and U.S. Routes 63 and 218 at Waterloo. Waterloo is also the location of the junction between U.S. Route 20 and the proposed “Avenue of the Saints” interstate-level highway that would link St. Louis, Missouri and St. Paul, Minnesota. These interconnections provide access between the communities served by U.S. Route 20 and the major markets and business centers of the Midwest.

ISTEA authorized the study and/or implementation of specific demonstration projects. Section 1107 of ISTEA provides assistance for highway projects demonstrating innovative techniques of highway construction and finance. Environmental studies, preliminary engineering, and design studies for improving U.S. Route 20 to four lanes in Jo Daviess and Stephenson Counties is one of the projects authorized under Section 1107 of ISTEA.

1.3 Need for Proposed Action

The need for the proposed project is based on several aspects of the currently inadequate transportation system. The following sections address the need for the proposed action in terms of regional economic characteristics, system capacity, safety concerns, community access, and system continuity.

1.3.1 Regional Economic Characteristics

Recent increases in tourism and recreational related activities, a dramatic growth in the number of second homes, and shifts in employment trends in the southern and central regions of Jo Daviess County have resulted in a doubling of traffic on U.S. Route 20 over the past two decades. Local commuting patterns and increased truck travel have also contributed to the additional traffic on U.S. Route 20.

Major centers of commerce within the project area include the city of Galena (pop. 3,460), the resorts associated with the Galena Territory, the village of Elizabeth (pop. 682), the village of Stockton (pop. 1,926), and the city of Freeport (pop. 26,443). Galena is the county seat of Jo Daviess County and a focus of commerce and employment for the region. The Galena Territory is a popular resort area and the site of numerous second homes. Elizabeth is a rural community, which includes small businesses and is the agricultural service center of the county as well as the location of the local Vocational Center and Rural Electrification Office. Farm

operations represent a major economic base in both Jo Daviess and Stephenson Counties. Smaller villages such as Lena and Eleroy and the township of Woodbine all contain small businesses, various manufacturing operations and dairy processing facilities. The west end of the Freeport bypass is the eastern terminus of the project. Freeport is the county seat of Stephenson County and is home to over half of the population in the county. Major employers in the city include Micro Switch, Kelly Springfield, Economy Fire & Casualty Co., and Thermos Co.

This region has experienced significant increases in tourism in recent years. Tourism is a major economic generator with attractions such as the Galena National Historic District and the Apple River Canyon State Park. The Galena National Historic District is the third most popular tourist destination in the State, with an estimated one million visitors per year[2]. The average attendance at Apple River Canyon State Park was 212,400 per year between 1991 and 1995[3]. In addition to these attractions, a number of visitors from Illinois attend dog track racing and river boat gambling in Dubuque, Iowa.

Significant growth has occurred in the scenic and recreation-oriented tourism industry. The Chestnut Mountain Resort, south of the Galena Territory, and the Eagle Ridge Inn and Resort in the Galena Territory are two of the three largest employers in the county. Both resorts have hotels. The Galena Territory includes condominiums and second homes centered around lakes and golf courses. Chestnut Mountain has the region's largest skiing facilities. An estimated eighty-five percent of all homes in the Territory are second residences for people from the Chicago area. Growth is expected to continue in the second home communities of the Galena Territory and Apple Canyon Lake, another recreation-oriented development, located to the east. The Galena Territory is currently at 56 percent of capacity. Approximately 50 new homes are being built each year. It is expected that the area will reach 85 percent capacity by the year 2010. The first phase of Longhollow Point Resort, a 69-unit new condominium/hotel complex has been built near the entrance to Galena Territory; a total of 250-units are planned to be constructed. South of U.S. Route 20 and across from Longhollow Point Resort is the planned Saddleback development consisting of a golf course with commercial properties and a residential subdivision.

Other areas near the project are growing and are expected to continue this trend. Immediate plans for development in the city of Galena include a 102-acre industrial park on the west side of the city as well as a 30-acre mixed-use development and a 103 single family home subdivision on the east side of Galena. Industrial development is expected to continue in the areas south of the city of East Dubuque. Commercial development continues around Freeport.

In addition to the significantly increased travel due to the tourist attractions and development, there are more local trips and greater truck transport demand. Many workers commute to nearby regional employment centers from rural and semi-rural residences. Many residents use U.S. Route 20 to reach work destinations in Dubuque to the west and the cities of Freeport and Rockford to the east. Truck usage of U.S. Route 20 has continually increased through the past decades, since it is the only major east-west highway in the area.

1.3.2 System Capacity

The need for a four-lane facility to serve Jo Daviess and Stephenson Counties was identified in the 1960s. Since then, travel demand along U.S. Route 20 in this region has grown significantly. Measured in terms of Average Daily Traffic (ADT), travel demand along existing U.S. Route 20

[2] Source: Galena/Jo Daviess County Convention and Visitors Bureau
[3] Source: Illinois Department of Natural Resources

has more than doubled on most segments between 1965 and 1995 despite the relatively stable population levels. Traffic volumes on the westernmost 60 percent of the highway have grown during the period from 1985 to 1993 at an average annual rate of nearly 5.5 percent (compounded annually). The section of U.S. Route 20 between Illinois Route 73 and the city of Freeport has experienced a similar rate of growth.

The growth in travel demand on U.S. Route 20 can be attributed to several factors, all of which are related to the functions served by the highway, as well as national trends. One of these factors is increased interregional travel, in particular truck travel, as the trucking industry has accounted for an increasing share of goods movement since the 1960's. Completion of major segments of the interstate highway system in the 1970's provided a large boost to the use of trucks to transport freight. Travel by commercial truck has continued to grow ever since. Another component of interregional travel is rail travel, both for handling freight and passenger traffic. The handling of freight by rail is still used in the transportation of goods in northwestern Illinois/northeastern Iowa. However, passenger rail service was halted in 1981 due to low ridership.

This growth in travel demand has increasingly affected traffic flow. This is particularly true during summer and fall weekends when additional travel demand by tourists and part-time residents frequently exceeds the roadway's capacity, resulting in extensive backups.

Existing traffic and traffic projections for existing U.S. Route 20 for the year 2020 indicate the need for a four-lane facility (Figure 1-3). Traffic projections, as developed by the Department using a growth rate of 3.36 percent, were based on existing traffic conditions (traffic counts) along existing U.S. Route 20 in Jo Daviess and Stephenson Counties during summer and fall 1993 and spring and summer 1994. According to the latest Department criteria, a four-lane facility is warranted when traffic reaches a two-way Design Hourly Volume (DHV) of 800. The DHV is a measure representing the 30th maximum hour (30HV) in the Design Year. As shown in Figure 1-3, almost all of the sections of existing U.S. Route 20 between Galena and Freeport have a current 30 HV that already meets four-lane warrants with the projected Design Hourly Volume far exceeding the warrants. In addition, truck travel in general is expected to continue to grow, even though the existing U.S. Route 20 geometrics were not designed to accommodate the larger trucks that are coming into greater use by the trucking industry.

Increased traffic volumes lower the "level of service" of U.S. Route 20. Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream. LOS ratings for a mainline facility are described as follows:

- LOS A - Describes free flow conditions. Operation of vehicles is virtually unaffected by the presence of other traffic.
- LOS B - Generally, free flow conditions, although presence of other vehicles begins to be noticeable
- LOS C - Influences of traffic density on operations become marked.
- LOS D - Borders on unstable traffic flow. Ability to maneuver is severely restricted.
- LOS E - Unstable flow, little to no maneuverability and increased amount of stoppage.
- LOS F - Flow breakdown. Demand exceeds capacity.

As shown in Table 1-1, the existing 2-lane facility in the year 2010 provides a LOS D for one segment of the route. In the year 2020, the existing 2-lane facility is projected to provide a LOS

Figure 1-3 Existing and Projected Design Hourly Volumes For U.S. Route 20

TABLE 1-1
EXISTING U.S. ROUTE 20 - LEVEL OF SERVICE
Two Lane, General Segment Analysis

	1993				2010 LOS				2020 LOS					30th
	Existing Conditions				Projected Conditions				Projected Conditions				%	Max Hour
SEGMENT	30HV	ADT	% NPZ	LOS	30HV	ADT	% NPZ	LOS	DHV	ADT	% NPZ	LOS	Trucks	as % of ADT
ILLINOIS ROUTE 84 (N) to Galena ECL	1,035	9,000	88	E	1,788	15,550	20	E	2,300	20,000	20	F	7.1%	11.5
Galena ECL to Wachter Rd.	1,020	6,800	71	E	1,770	11,800	20	E	2,280	15,200	20	F	6.6	15
Wachter Rd. to ILLINOIS ROUTE 84 (S)	855	5,700	94	D	1,470	9,800	20	E	1,890	12,600	20	E	7.9	15
ILLINOIS ROUTE 84 (S) to Derinda Rd.	810	5,400	62	D	1,388	9,250	20	E	1,785	11,900	20	E	8.1	15
Derinda Rd. to IL 78 (S)	780	5,200	56	D	1,350	9,000	20	E	1,740	11,600	20	E	8.3	15
IL 78 (S) to IL 78 (N)	930	6,200	4	C	1,598	10,650	4	E	2,055	13,700	4	E	8.0	15
IL 78 (N) to ILLINOIS ROUTE 73	780	5,200	69	C	1,350	9,000	20	D	1,740	11,600	20	E	9.2	15
ILLINOIS ROUTE 73 to U.S. Route 20 bypass	1,100	8,800	44	D	1,894	15,150	20	E	2,440	19,500	20	E	6.3	12.5

Definitions: DHV - Design Hourly Volume
LOS - Level of Service
% NPZ - Approximate Percent No Passing Zone
30HV - 30th Highest Hourly Volume

Notes: Projected conditions assume that a 4-lane highway is not built; however, it does assume that the Department's current policy of maintenance and roadway improvements will continue; for calculation purposes 20% maximum no passing zones assumed for years 2010 and 2020.

The basis for the traffic analysis is a twenty-year design commencing at the start of the study period. Travel patterns in the region have not been significantly altered during the development of this DEIS and continue to indicate a need for the project.

E for six of the segments and a LOS F for two of the segments along the route. A LOS of D or below indicates extensive delays, reduced speeds and maneuverability, higher crash rates, and increased congestion. Current Department design criteria requires at least a LOS of B for a major rural highway.

1.3.3 Safety Concerns

U.S. Route 20 in the project area was constructed through a corridor whose topographic and geologic features are characterized by undulating terrain, with steep ridges and narrow valleys and bedrock strata that lie close to the surface. These physical conditions directly influenced the highway's alignment configuration, which often followed the existing contours of the area's ridges and valleys. Further, the past era's roadway design standards were not adequate for today's higher performance vehicles, truck class dimensions, and overall traffic volumes.

The existing geometry of U.S. Route 20 also reduces the efficiency to move people and goods through the region. Traffic backups develop at many locations behind slow moving vehicles, a result of extensive lengths of no-passing zones, restricted sight distances, steep grades and, generally, only one travel lane operating in each direction. Furthermore, many of the advisory speeds for substandard sections of U.S. Route 20 are at least 25 percent lower than the typical regulated speed of 80 kph (55 mph) for a rural major arterial. This has increased travel time between the U.S. Route 20/Illinois Route 84 intersection on the west and Freeport on the east.

Consequently, most of existing U.S. Route 20 (approximately 73 percent) between Galena and Freeport does not meet the Department's current design standards for a rural highway. Nearly 50 percent of existing U.S. Route 20 between Galena and Freeport is comprised of vertical and horizontal curves that do not meet the Department's current standards for a 90 kph (65 mph) design speed for rural highways. In addition, more than 10 percent of this section has grades steeper than the maximum grade allowed for a roadway to remain in place. The Department's design criteria based on 90 kph (65 mph) design speed for a two-lane roadway states that the maximum vertical grade is 5 percent.

According to current Department design standards for a two-lane roadway, passing sight distance (passing zones) should be available for at least 40 percent of a roadway's length. Along eastbound U.S. Route 20, passing zones account for only 34 percent of the roadway, while along westbound U.S. Route 20, passing is permitted along only 37 percent of the roadway. Actual passing opportunities are available much less than these percentages due to the high volume of traffic. In addition, many of the at-grade intersections within the project limits have substandard turning radii, sight distances, grades and capacity. Shoulders adjacent to the majority of the U.S. Route 20 pavement are either minimal or non-existent.

Due to the expanded years covered by the study, crash data has been reviewed for a period covering 1984 thorough 1999. As shown in Table 1-2, over the 12 year period from 1984 to 1995, a total of 2,466 crashes have been reported along U.S. Route 20 in the project area. Of these crashes, 686 occurred from 1990 to 1992, as shown in Table 1-3, and 638 occurred from 1993 to 1995, as shown in Table 1-4. This analysis provides detailed data for this six-year period. Crash data has become available for a more recent three year period from 1997 to 1999. However, this data has not been analyzed, as the total number of crashes and types have continued to exhibit the same trends as the years previously analyzed. Consequently, this information would not change the conclusions that have already been drawn. Table 1-5 summarizes the crash data for this three year period with a total of 644 crashes involving 268 injuries and 10 fatalities. These figures may be compared to Table 1-3 and Table 1-4.

TABLE 1-2
CRASH TYPE AND NUMBER, 1984-1995

CRASH TYPE	NUMBER OF OCCURRENCES												
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL
A. ANGLE	4	6	3	8	8	7	7	8	8	7	16	20	102
B. ANIMAL	21	29	34	40	42	45	62	60	45	47	33	52	510
C. BICYCLIST	0	0	0	0	0	1	0	0	0	0	0	0	1
D. FIXED OBJECT – OFF ROAD	41	41	56	48	42	51	42	40	36	38	33	48	516
E. HEAD ON	9	8	7	7	5	4	11	6	4	5	7	3	76
F. OTHER NON-COLLISION	1	2	3	0	1	2	0	1	2	0	12	8	32
G. OTHER NON-COLLISION – OFF ROAD	8	16	7	9	11	17	9	11	12	4	0	3	107
H. OTHER OBJECT – OFF ROAD	0	2	2	1	0	1	1	2	0	1	2	0	12
I. OVERTURNED – OFF ROAD	7	8	14	15	11	9	18	12	14	7	0	4	119
J. OVERTURNED – ON ROAD	2	0	5	0	4	3	0	1	0	2	8	6	31
K. PARKED VEHICLE	3	3	5	2	0	3	2	2	5	2	2	2	31
L. PEDESTRIAN	0	0	2	1	0	0	0	1	0	0	0	0	4
M. REAR END – BOTH MOVING	5	9	13	7	6	14	13	10	13	10	0	0	100
N. REAR END – ONE STOPPED	14	23	29	28	21	28	32	35	20	41	64	59	394
O. SIDESWIPE – OPPOSITE DIRECTION	8	8	8	7	11	6	15	10	9	7	3	5	97
P. SIDESWIPE – SAME DIRECTION	7	6	4	5	3	5	6	5	11	10	2	4	68
Q. TURNING	19	28	22	12	20	19	24	25	29	23	18	16	255
R. OTHER ON ROADWAY	0	0	0	0	0	0	0	4	3	2	1	1	11
TOTAL INJURED	49	81	96	95	77	79	140	95	100	95	122	110	1139
FATALITIES	4	2	2	4	3	3	3	3	1	1	6	0	32
TOTAL CRASHES	149	189	214	190	185	215	242	233	211	206	201	231	2466

CONDITION SUMMARY	NUMBER OF OCCURRENCES												
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL
W WET	31	44	48	44	29	40	63	40	35	43	26	37	480
I/s ICE AND SNOW	30	55	43	29	25	30	18	44	30	28	37	16	385
N NIGHT	60	69	87	90	87	95	84	82	80	60	53	53	900

Source: Illinois Department of Transportation, 2001.

TABLE 1-3
CRASH TYPE AND NUMBER, 1990-1992

CRASH	CRASH TOTALS				PERCENTAGES			
	YEARLY			PERIOD	YEARLY			PERIOD
	1990	1991	1992	1990-1992	1990	1991	1992	1990-1992
A. ANGLE	7	8	8	23	2.89%	3.43%	3.79%	0
B. ANIMAL	62	60	45	167	25.62%	25.75%	21.33%	24.34%
C. BICYCLIST	0	0	0	0	0.00%	0.00%	0.00%	0.00%
D. FIXED OBJECT – OFF ROAD	42	40	36	118	17.36%	17.17%	17.06%	17.20%
E. HEAD ON	11	6	2	19	4.55%	2.58%	0.95%	2.77%
F. OTHER NON-COLLISION	0	1	4	5	0.00%	0.43%	1.90%	0.73%
G. OTHER NON-COLLISION – OFF ROAD	9	11	12	32	3.72%	4.72%	5.69%	4.66%
H. OTHER OBJECT – OFF ROAD	1	2	0	3	0.41%	0.86%	0.00%	0.44%
I. OVERTURNED – OFF ROAD	18	12	14	44	7.44%	5.15%	6.64%	6.41%
J. OVERTURNED – ON ROAD	0	1	0	1	0.00%	0.43%	0.00%	0.15%
K. PARKED VEHICLE	2	2	5	9	0.83%	0.86%	2.37%	1.31%
L. PEDESTRIAN	0	1	0	1	0.00%	0.43%	0.00%	0.15%
M. REAR END – BOTH MOVING	13	10	13	36	5.37%	4.29%	6.16%	5.25%
N. REAR END – ONE STOPPED	32	35	20	87	13.22%	15.02%	9.48%	12.68%
O. SIDESWIPE – OPPOSITE DIRECTION	15	10	9	34	6.20%	4.29%	4.27%	4.96%
P. SIDESWIPE – SAME DIRECTION	6	5	11	22	2.48%	2.15%	5.21%	3.21%
Q. TURNING	24	25	29	78	9.92%	10.73%	13.74%	11.37%
R. OTHER ON ROADWAY	0	4	3	7	0.00%	1.72%	1.42%	1.02%
TOTAL INJURED	140	95	100	335	62.50%	40.77%	47.39%	48.83%
FATALITIES	3	3	1	7	1.24%	1.29%	0.47%	1.02%
TOTAL CRASHES	242	233	211	686	100.00%	100.00%	100.00%	100.00%

Source: Illinois Department of Transportation, 2001.

TABLE 1-4
CRASH TYPE AND NUMBER, 1993-1995

CRASH	CRASH TOTALS				PERCENTAGES			
	YEARLY			PERIOD	YEARLY			PERIOD
	1993	1994	1995	1993-1995	1993	1994	1995	1993-1995
A. ANGLE	7	16	20	43	3.40%	7.96%	8.66%	6.74%
B. ANIMAL	47	33	52	132	22.82%	16.42%	22.51%	20.69%
C. BICYCLIST	0	0	0	0	0.00%	0.00%	0.00%	0.00%
D. FIXED OBJECT – OFF ROAD	38	33	48	119	18.45%	16.42%	20.78%	18.65%
E. HEAD ON	5	7	3	15	2.43%	3.48%	1.30%	2.35%
F. OTHER NON-COLLISION	0	12	8	20	0.00%	5.97%	3.46%	3.13%
G. OTHER NON-COLLISION – OFF ROAD	4	0	3	7	1.94%	0.00%	1.30%	1.10%
H. OTHER OBJECT – OFF ROAD	1	2	0	3	0.49%	1.00%	0.00%	0.47%
I. OVERTURNED – OFF ROAD	7	0	4	11	3.40%	0.00%	1.73%	1.72%
J. OVERTURNED – ON ROAD	2	8	6	16	0.97%	3.98%	2.60%	2.51%
K. PARKED VEHICLE	2	2	2	6	0.97%	1.00%	0.87%	0.94%
L. PEDESTRIAN	0	0	0	0	0.00%	0.00%	0.00%	0.00%
M. REAR END – BOTH MOVING	10	0	0	10	4.85%	0.00%	0.00%	1.57%
N. REAR END – ONE STOPPED	41	64	59	164	19.90%	31.84%	25.54%	25.71%
O. SIDESWIPE – OPPOSITE DIRECTION	7	3	5	15	3.40%	1.49%	2.16%	2.35%
P. SIDESWIPE – SAME DIRECTION	10	2	4	16	4.85%	1.00%	1.73%	2.51%
Q. TURNING	23	18	16	57	11.17%	8.96%	6.93%	8.93%
R. OTHER ON ROADWAY	2	1	1	4	0.97%	0.50%	0.43%	0.63%
TOTAL INJURED	95	122	110	327	46.12%	60.70%	47.62%	51.25%
FATALITIES	1	6	0	7	0.49%	2.99%	0.00%	1.10%
TOTAL CRASHES	206	201	231	638	100.00%	100.00%	100.00%	100.00%

Source: Illinois Department of Transportation, 2001.

TABLE 1-5
CRASH TYPE AND NUMBER SUMMARY, 1997-1999

CRASH	CRASH TOTALS				PERCENTAGES			
	YEARLY			PERIOD	YEARLY			PERIOD
	1997	1998	1999	1997-1999	1997	1998	1999	1997-1999
A. ANGLE	19	16	27	62	8.56%	7.69%	12.62%	9.63%
B. ANIMAL	46	32	50	128	20.72%	15.38%	23.36%	19.88%
C. BICYCLIST	0	0	0	0	0.00%	0.00%	0.00%	0.00%
D. FIXED OBJECT – OFF ROAD	44	36	23	103	19.82%	17.31%	10.75%	15.99%
E. HEAD ON	2	3	4	9	0.90%	1.44%	1.87%	1.40%
F. OTHER NON-COLLISION	4	9	3	16	1.80%	4.33%	1.40%	2.48%
G. OTHER NON-COLLISION – OFF ROAD	0	1	0	1	0.00%	0.48%	0.00%	0.16%
H. OTHER OBJECT – OFF ROAD	5	7	11	23	2.25%	3.37%	5.14%	3.57%
I. OVERTURNED – OFF ROAD	1	0	1	2	0.45%	0.00%	0.47%	0.31%
J. OVERTURNED – ON ROAD	7	10	4	21	3.15%	4.81%	1.87%	3.26%
K. PARKED VEHICLE	2	1	2	5	0.90%	0.48%	0.93%	0.78%
L. PEDESTRIAN	1	0	0	1	0.45%	0.00%	0.00%	0.16%
M. REAR END – BOTH MOVING	9	7	13	29	4.05%	3.37%	6.07%	4.50%
N. REAR END – ONE STOPPED	57	64	56	177	25.68%	30.77%	26.17%	27.48%
O. SIDESWIPE – OPPOSITE DIRECTION	6	6	11	23	2.70%	2.88%	5.14%	3.57%
P. SIDESWIPE – SAME DIRECTION	7	7	6	20	3.15%	3.37%	2.80%	3.11%
Q. TURNING	12	9	3	24	5.41%	4.33%	1.40%	3.73%
R. OTHER ON ROADWAY	0	0	0	0	0.00%	0.00%	0.00%	0.00%
TOTAL INJURED	72	113	83	268	32.43%	54.33%	38.79%	41.61%
FATALITIES	2	1	7	10	0.90%	0.48%	3.27%	1.55%
TOTAL CRASHES	222	208	214	644	100.00%	100.00%	100.00%	100.00%

Source: Illinois Department of Transportation, 2001.

From an operational perspective, U.S. Route 20's history of relatively high crash rates is indicative of substandard roadway geometry. The number of high crash locations along U.S. Route 20 between the city of Galena and the city of Freeport has been higher for the 3-year period from 1989 to 1991 than for highways in the State as a whole. The locations were numbered 9, 11, and 10, respectively, for each of the three years and were included in the top 1,000 high crash locations statewide outside of the Chicago metropolitan area.

Over the 10-year period between 1984 and 1993, a total of 2,034 reported crashes occurred within the project area. Of this total, vehicles leaving the roadway accounted for approximately one-third (33 percent) of the total crashes, while rear-end and turning/angle collisions accounted for an additional 29 percent of the total crashes. These types of crashes typically coincide with the types of roadway conditions that characterize substantial sections of U.S. Route 20, including substandard horizontal alignments, inadequate shoulder widths, restricted sight distances, and conflicting turning movements at intersection and driveway locations. Of the 2,034 reported crashes, 650 (32 percent) occurred during the three-year period from 1991 to 1993.

Animal hits, predominantly deer, account for over 23 percent of the total crashes along U.S. Route 20 during this period, making this the most frequently occurring crash type. The limited sight distances and substandard shoulder widths that currently exist restrict drivers' reaction time and limit vehicle maneuverability. These deficiencies help contribute to the high number of animal/vehicle collisions and vehicles leaving the roadway. What is not noted is the number of crashes caused by near animal hits. With the high volume of traffic on U.S. Route 20 and the limited room to maneuver, defensive maneuvers to avoid hitting a deer, or any other animal, can contribute to these crashes.

Types of fixed object/off road crashes and those of the rear-end-with-one-vehicle-stopped type are the next most frequent types to occur between 1991 and 1993, making up over 18 percent and 15 percent of the crashes, respectively. These types of crashes are often attributed to excessive vehicle speed, inadequate clear zones, or horizontal deficiencies. Furthermore, the high traffic volume has resulted in heavy congestion, thus limiting the space between vehicles in the traffic stream and therefore lowering the amount of time drivers have to safely react to events occurring in front of them. This lowered reaction time can cause some drivers to over-compensate and lose control of their vehicle thus contributing to fixed-object off-road crashes.

An analysis of night crashes was performed for U.S. Route 20 between Galena and Freeport for each of the years from 1991 to 1993. A crash rate was calculated using a representative percentage of the average daily traffic (ADT) for nighttime traffic and those non-animal collisions that occurred during the hours of dusk, dark, and dawn. When a weighted average is taken for this length of U.S. Route 20, all three years show an average crash rate that is above that of the average rate. For 1993 the night crash rate was 115.2 crashes per 100 million vehicle miles versus a statewide average of 93.6 per 100 million vehicle miles (does not include the Chicago Metropolitan Area).

A night to day crash rate ratio was calculated. In the years 1993, 1994, and 1995, 41 percent, 23 percent and 49 percent respectively of the U.S. Route 20 roadway has a ratio that exceeded one. A ratio that is greater than one is an indicator that the effect of the roadway deficiencies is intensified by the absence of light. This results in more hazardous conditions for drivers as information (view of the road) is not being provided in a timely manner and, therefore, contributes to a higher crash rate.

Aside from geometric deficiencies, the number of crashes occurring along U.S. Route 20 can also be attributed to the higher than optimum traffic volumes. As the design hourly volume

(DHV) continues to increase along U.S. Route 20, the level of service continues to decline. A level of service of B provides for stable operations and is the minimum level of service that is desired. According to the latest Department criteria, a LOS of B can be maintained on a two-lane facility with a two-way DHV of 800 or less. With the current DHV ranging from 780 to 1100 vehicles per hour, almost all segments of U.S. Route 20 are already exceeding such a level of service. This has several detrimental effects on the drivers' safety. The number of vehicles on the road at one time causes a reduction in the drivers' physical and psychological comfort including less time to physically react to movements of other vehicles, reduced driver comfort within the congested traffic stream, and driver overcompensation. The increased congestion may also result in drivers taking unnecessary risks.

Approximately 8-10 percent of the vehicles on U.S. Route 20 are trucks (all trucks except pickup trucks). Most of these trucks are unable to maintain their speed up some of the steep grades. This may cause motorists to attempt to pass in areas where it would not be safe. The size of the trucks, campers and vehicles pulling trailers makes it difficult for vehicles following them to see upcoming curves, hills, intersections, and oncoming traffic.

Although many of the crashes along U.S. Route 20 may be attributable to geometric deficiencies, straightening the curves and widening the shoulders will not correct all the safety problems along this section of U.S. Route 20. The Department has already made geometric improvements to many sections of U. S. Route 20 which had higher numbers of crashes, but the number of sections along U.S. Route 20 on the Department's High Crash Location list still remains relatively constant. To be considered a high crash location, a roadway segment must have an crash history that is significantly higher than average in at least one of the following categories:

- Crash frequency;
- Crash severity;
- Crash rate; and
- A trend showing an abnormal increase in the number of crashes over a three-year period.

Geometric improvements have removed some segments from the high crash list; however, the number of segments taken off the list is equalized by the number of new segments along U.S. Route 20 that have been added to the list. The most likely cause for this equalization is the higher traffic volumes. To reduce the total number of segments along U.S. Route 20 on the high crash location list, a combination of geometric improvements and traffic capacity improvements is required.

The above data and information indicate a geographical relationship between high crash locations and locations of substandard geometry along U.S. Route 20. The lack of design consistency, deficient geometrics, and traffic conflicts created at numerous intersections and driveway locations characterize U.S. Route 20 between Galena and Freeport.

1.3.4 Community Access

An additional need for the proposed project is to improve access between the communities located along U.S. Route 20 and to improve access between Jo Daviess and Stephenson Counties and the metropolitan areas and markets in Illinois and the surrounding states. An overview of the existing road network shows that U.S. Route 20 is an integral part of the local road system. This is caused by the topography of the area which does not lend itself to a grid roadway network typical in other areas of Illinois. As part of the local road system, U.S. Route 20 experiences a varied traffic mix. Vehicles using the roadway include farmers moving their

equipment from farmstead to field; school buses picking up children in the outlying areas and taking them to schools in the city of Galena, the villages of Elizabeth, Stockton, Lena and the city of Freeport; residents in the outlying areas traveling to the services provided in the communities; and through traffic making interregional trips.

Traffic along existing U.S. Route 20 has continued to increase as a result of local travel demand. As stated, U.S. Route 20 serves as a major link between many of the communities in both Jo Daviess and Stephenson Counties, particularly for those households that depend on the private automobile and truck for work, leisure and shopping activities, as well as for businesses moving their products from farm to market. This increase in local travel demand has been the result of several factors. Non-farm employment in Jo Daviess and Stephenson Counties has increased by approximately 5,800 jobs between 1980 and 1997 while farm employment has decreased by approximately 1,480 jobs in the same time period. The number of housing units in the counties has increased by 4,731 between 1980 and 2000. Comparable job growth in the nearby regional centers of Rockford and Dubuque (Figure 2) has also occurred. The city of Galena, the Galena Territory, the various recreational resorts, the villages of Eleroy, Lena, Elizabeth, and Stockton and the township of Woodbine all provide employment and service opportunities to the residents of Jo Daviess and Stephenson Counties.

Examples of local traffic demand include the dairy farmer in the western portions of Jo Daviess County delivering milk to the dairy processing plants in the village of Stockton. The dairy products are then shipped from Stockton to markets in Wisconsin and Eastern Illinois. A major lumber company in Eleroy receives raw lumber from suppliers in the west and produces roof trusses and prefabricated walls for delivery to markets in the Chicago area and Iowa. The village of Lena provides additional workforce for the commercial and industrial businesses in Freeport. As the businesses and recreational areas continue to grow and serve the region, the need for an improved and expanded roadway facility linking these areas becomes more important.

1.3.5 System Continuity

The Department's Office of Planning and Programming classifies U.S. Route 20 as a Major Arterial Highway within the rural State highway system. In general, major arterials are expected to provide a high degree of mobility and, therefore, should permit high operation speeds and direct routing to favor the longer trip lengths. In terms of service characteristics, the Major Arterial Highway system is intended to: (1) link cities, large towns, and other "long distance trip" traffic generators (such as resort areas); (2) provide internal spacing consistent with land use and population density patterns, such that all developed areas in the State are within reasonable distances of the highway network; and (3) integrate interstate and inter-county service.

The 47-mile portion of U.S. Route 20 from Illinois Route 84 and Galena to Freeport is the last remaining two-lane section of U.S. Route 20 between Waterloo, Iowa and Rockford, Illinois, other than the Julien Dubuque Bridge across the Mississippi River. Increasing the capacity of the bridge is currently under study by DMATS in cooperation with the Iowa Department of Transportation and the Department. East of Rockford, the east-west travel function is provided by I-90 that essentially extends the nearly continuous four-lane east-west corridor provided by U.S. Route 20 to Chicago and points east.

U.S. Route 20 in northwest Illinois also serves to link important north-south roadways and population centers in the region. These interconnections provide access between the communities served by U.S. Route 20 to the major markets and business centers of the Midwest. In particular, U.S. Route 20 (near Waterloo, Iowa) would connect to the selected

"Avenue of the Saints," an interstate-level highway linking St. Louis, Missouri and St. Paul, Minnesota. In addition to these interconnections, U.S. Route 20 via the link with Illinois Route 84, west of the village of Elizabeth in Jo Daviess County serves the Savanna Army Depot which is being redeveloped to include commercial, residential, and industrial uses.

The proposed project is needed to complete the missing four-lane section on U.S. Route 20 between Galena and the Freeport Bypass. Upon completion of this project and the Mississippi bridge at Dubuque, U.S. Route 20 would have continuous four-lane capacity from northwestern Illinois to northern Iowa (from Rockford to Waterloo).